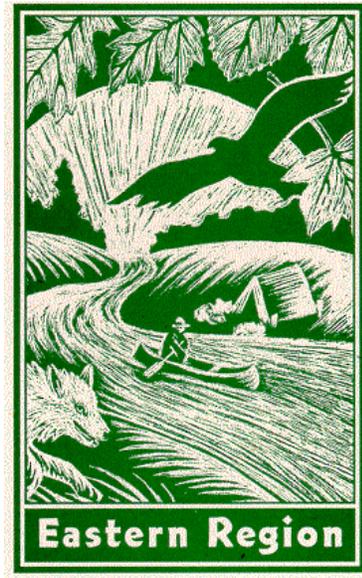


*Conservation Assessment
for
Channel Darter (*Percina copelandi*)*



USDA Forest Service, Eastern Region
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Allegheny and Huron-Manistee National Forests

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This Conservation Assessment was prepared to compile the published and unpublished information on the subject taxon or community; or this document was prepared by another organization and provides information to serve as a Conservation Assessment for the Eastern Region of the Forest Service. It does not represent a management decision by the U.S. Forest Service. Though the best scientific information available was used and subject experts were consulted in preparation of this document, it is expected that new information will arise. In the spirit of continuous learning and adaptive management, if you have information that will assist in conserving the subject taxon, please contact the Eastern Region of the Forest Service- Threatened and Endangered Species Program at 310 West Wisconsin Avenue, Suite 580 Milwaukee, Wisconsin 53203.

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EXECUTIVE SUMMARY

Percina copelandi (channel darter) is designated as a Regional Forester Sensitive Species on the Allegheny and the Huron-Manistee National Forests in the Eastern Region of the Forest Service. The species occurrence is documented but not listed on the Hoosier and Mark Twain National Forests. The purpose of this document is to provide background information necessary to prepare a Conservation Approach, the later which will include management actions to conserve the species. Channel darters inhabit the warmer waters of large creeks, rivers, and lakeshores. They are diurnal, benthic feeders who consume macroinvertebrates, algae, and bottom debris. In early spring to summer, they make short migrations to breeding areas of small rocks or fine gravel with a moderate current and no sand. Males establish small territories where they spawn with several females. The eggs are deposited, fertilized, and left unattended. Channel darters usually live in deeper habitat (≥ 1 m) than Etheostoma species. In Pennsylvania, channel darters have been documented on the Allegheny National Forest in the Allegheny River, Tionesta Creek, and Cornplanter Run. In Michigan, the channel darter has been documented on several rivers in the state, including the Au Sable and Pine rivers on the Huron-Manistee National Forest. Potential threats include siltation, turbidity, incidental pollution, impoundments, parasites, and predators.

NOMENCLATURE AND TAXONOMY

SCIENTIFIC NAME: *Percina copelandi* (Jordan, 1877)

COMMON NAME: channel darter, Copeland's darter

FAMILY: *Percidae*

SYNONYMS: *Rheocrypta copelandi* - Jordan 1877a:9
Cottogaster copelandi - Jordan and Evermann 1896-1900: 1045
Hadropterus copelandi - Hubbs and Lagler 1958:107
Percina copelandi - Bailey et al. 1954:14
Hubbs and Lagler 1964:vii

darters vary with locality and may actually encompass several subspecies (Kuehne and Barbour 1983).

Summary of Key Characteristics

- The key characteristics of the genus *Percina* are:
 - two anal spines
 - a complete lateral line
 - no interruptions in head canals
 - enlarged and strongly toothed scales on the breast and in a row along the midline of the belly of the male.
- The key characteristics of *P. copelandi* are:
 - snout does not project beyond upper jaw; dorsal spines usually fewer than 14; dorsal rays fewer than 14
 - branchiostegal membranes separate or slightly joined at isthmus (angle is acute)
 - premaxillary frenum absent or narrow (groove between upper jaw and snout)
 - 18 or fewer scales around caudal peduncle; 7-10 anal rays (usually 8-9); anal fin of adult male not elongated (Page 1983).

LIFE HISTORY

Behavior/Diet

P. copelandi inhabits the warmer waters of large creeks, rivers, and lakeshores. They are diurnal, benthic feeders, consuming macroinvertebrates along with algae and bottom debris (Scott and Crossman 1973). They feed on organisms between and behind rocks, but do not push over rocks with their snouts, as do the *P. caprodes* with whom they share habitat (Winn 1953). Their diet preferences seem to vary with locality, and Strange (1997) attributed this to dissimilar habitats and macroinvertebrate communities as well as morphological constraints. He found the stomach contents of channel darters in the Ohio River in West Virginia to be predominately chironomid larvae (87.2% *dicrotendipes* sp. and 3.2% *macropelopia* sp.) and pupae (4.8%), and zooplankton. Winn (1953) found the stomach contents to be primarily chironomid larvae and zooplankton, with some trichopteran larvae in Michigan. Page (1983) reports that ephemeropteran naiads were a component of their diet in Lake Erie and trichopteran larvae in Kansas.

Reproduction

Winn (1953, 1958) described reproduction in a population of channel darters in a Michigan river. Except for a few slow-growing individuals, this species matures in one year. Spawning occurs in late spring-early summer and seems dependant on water temperature (69-72°F). A fairly, rapid current is also a requirement for breeding as it ceased when the current was slowed. Males establish territories, each of which usually has at least one rock four inches in diameter or larger near its center. The size of the territory varies but is usually

a little less than one meter in diameter. Winn identified 30 territories within a 300 square foot area near the peak of the breeding season. The male positions itself behind the rock.

When ready to spawn, females swim into riffles occupied by the males and they then try to drive the female toward the center of the territory. Spawning takes place behind the large central rock in small rocks or fine gravel, but not in sand. After the female rocks her way into the gravel, the male mounts her with his caudal fin placed against hers. The eggs are deposited, fertilized from this position, and left unattended. Four to ten 1.4 mm eggs are deposited each mating session. Females mated with several males and laid between 357 and 721 eggs per spawning season (the older the female, the more eggs she laid). The eggs are demersal, adhesive, and partially transparent and contain an orange oil globule. The male channel darter will usually remain and defend the same territory for the entire spawning season, leaving for only brief periods and then traveling only three to four feet. Thus, he gives indirect protection to the eggs throughout the spawning season. However, upon conclusion of the breeding season, channel darters immediately left the edges of streams and lakeshores for deeper water (Winn 1953, 1958; Page 1983).

Hubbs' (1985) research indicates that the length of the reproductive season varies with latitude, resulting in longer seasons in the more southern latitudes. His research also suggests long reproductive seasons with multiple spawnings. Trautman (1981) claims that channel darters hybridize with logperch (*P. caprodes*).

The incubation period of the eggs is unknown and little is known about the growth rates of the young. Males apparently grow larger than females. Young-of-the-year channel darters were reported to be 20-38 mm in October and the largest specimen was 64 mm long (Trautman 1981). The life span of the channel darter is unknown but it is assumed to be about three or four years.

HABITAT

P. copelandi is a benthic species that inhabits large creeks and rivers in areas with sand and gravel/rubble substrates. They have also been found over sandy and gravelly shoals off the beaches of lakes. They prefer clear water and silt-free substrates (Goodchild 1994). According to Trautman (1981), the channel darter usually remained in water greater than one meter deep during the day and moved into the shallows at night. When it is time to spawn, they migrate to fast-flowing riffles and then migrate back when the breeding season is over (Winn 1953). Goodchild (1994) reports that channel darters overwinter in calm, debris-filled backwater pools. Stauffer (1996) found *P. copelandi* to consistently reside in deeper habitats than *Etheostoma* species. His study also showed them to be microhabitat specific as to water depth and velocities (both bottom and mean), but to be nonspecific when it came to choice of size of substrate. A recent documented occurrence on the ANF occurred in a cold headwater stream dominated by a gravel/rubble substrate. This stream is much smaller than that discussed in the literature, but it is a tributary to a large reservoir (USDA-FS 2000).

DISTRIBUTION AND ABUNDANCE

The channel darter occurs in the Great Lakes-St. Lawrence drainages from Michigan to Quebec, New York and Vermont; in the Ohio River and many of its tributaries; discontinuously from southeast Kansas and southwest Missouri to east Oklahoma and Arkansas to north Louisiana; and is most numerous in the Red, Ouachita, and Arkansas rivers west of the Mississippi River (Figure 2). In most areas, the channel darter is considered rare to uncommon (NatureServe 2001).

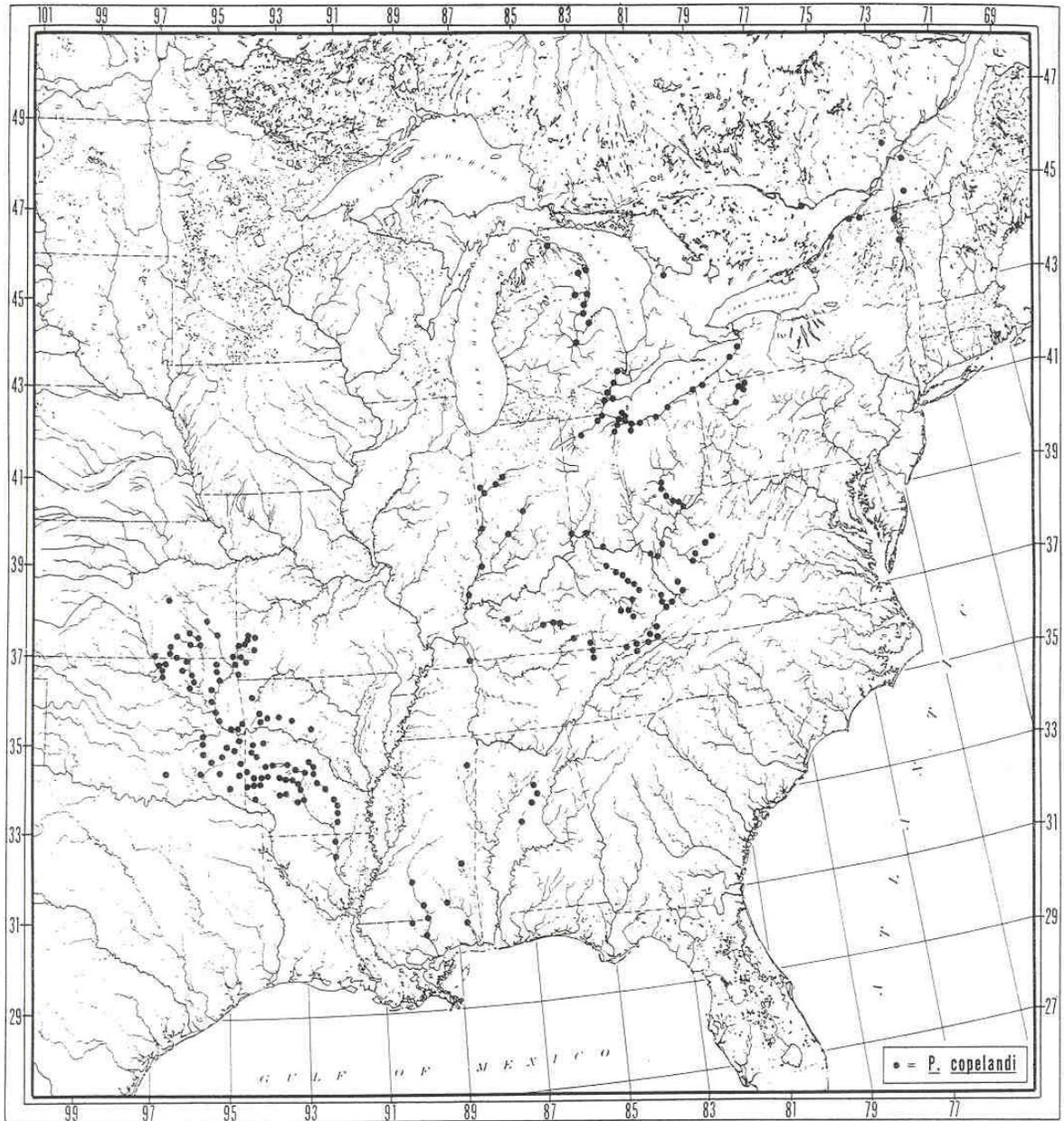


Figure 2. Distribution of the channel darter in North America (Page 1983).

In Pennsylvania, the channel darter is found in the Allegheny River and some of its tributaries, along the shores of Lake Erie, and in some Lake Erie tributaries (Figure 3). Within the proclamation boundary of the Allegheny National Forest, it has been documented in the Allegheny River downstream of the Kinzua Dam, in Tionesta Creek, and Cornplanter Run (USDA-FS 2000). Just upstream of the proclamation boundary, channel darters have been documented in the headwaters of the Allegheny River and in Potato Creek, a tributary to the Allegheny River (Rick Spears, Pennsylvania Fish and Boat Commission, pers. comm. 2001).

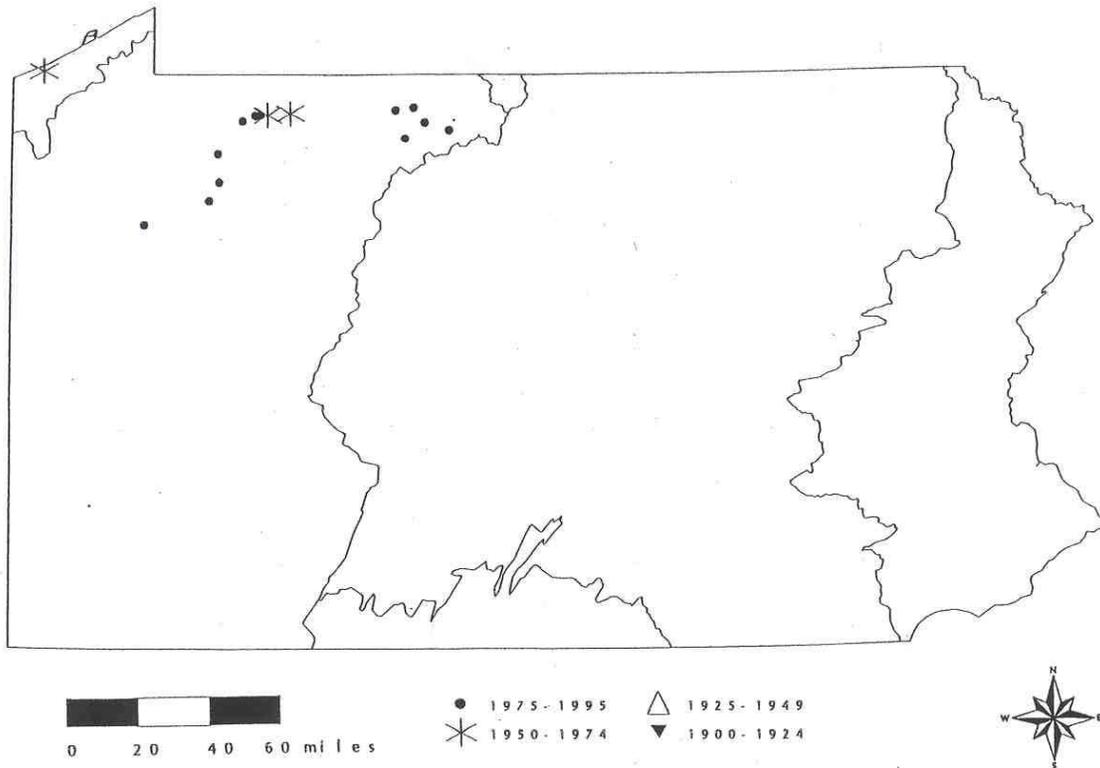


Figure 3. Distribution of the channel darter in Pennsylvania (Argent et al. 1997).

A survey by Schultz (1986) was conducted specifically to assess the status of the channel darter and the river darter (*P. shumardi*) in Michigan. Historically, channel darters had been found in the Detroit River, Huron River, Cass River, Saginaw Bay, Rifle River, Au Sable River, Pine River, Van Etten Creek, Devils Creek, Thunder Bay River, Cheboygan River, and Black River (Figure 4). In the 1986 survey, all of the aforementioned sites except the Detroit River were sampled, but channel darters were only found in the Au Sable and Pine rivers, both of which are at least partly within the proclamation boundary of the Huron National Forest. “The Au Sable sites were below dams with high velocity current in the central sections, but *P. copelandi* was found in protected areas on the downstream side of sand and gravel spits or bars in water 2 to 5 feet in depth” (Schultz 1986); they were found in “areas of slow to moderate flow over sand, gravel and cobble bottom.” The Au Sable River sites sampled were just below Five Channels Dam (the riverine-type habitat in the upper portion of Cooke Dam Pond, 40 miles upstream of the mouth), and just below Foote Dam, in the mainstem of the river 10 miles upstream of the mouth.

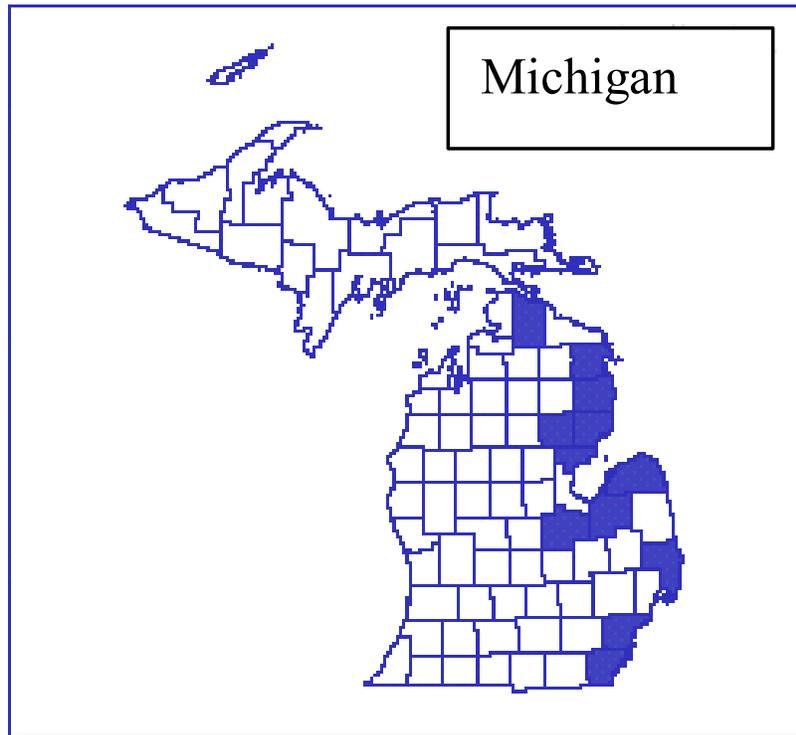


Figure 4. Distribution of the channel darter, by county, in Michigan (Carman and Goforth 2000).

In the Pine River, they were most abundant in areas that were “2 feet in depth and had slow but noticeable flow over shifting sand and sandy clay bottom.” The three sites sampled in the Pine River system were the intersection of the mainstem with Kings Corner Road, the intersection of the West Branch Pine with Mikado Road, and Van Etten Creek along Barlouw Road. The conclusion of the report was that the population of darters in the Au Sable River system appears to be abundant and thriving, but the status of populations in the other rivers

where there had been historic sightings is uncertain. This was due mainly to the fact that the sampling methods involved seining for these species in the shallows during mid-summer, after the main spawning period, and the darters may have moved to deeper waters.

In 1994, W. C. Latta of the Michigan Department of Natural Resources Institute for Fisheries Research sampled the five sites where Schultz had collected channel darters in the Au Sable and Pine rivers (Latta 1994). He found individuals at three of the five sites: in the Au Sable River below Five Channels Dam, in the Pine River at Kings Corner Road, and in the West Branch Pine River at Mikado Road. He did not sample any in the Au Sable below Foote Dam or in Van Etten Creek. Also, the number of channel darters sampled were greatly reduced from the 1986 survey, even with longer sampling time.

A crew from Michigan State University is currently (2001) conducting a study on the Pine River assessing the status of trout populations and potential steelhead habitat, and they are documenting all species sampled. At this time, they have verified the presence of channel darters in this system. Also, as in the 1986 survey, four channel darters were found just below Five Channels Dam in the Au Sable River during a 2001 biological survey conducted by the Michigan Department of Transportation in preparation for the installation of a new bridge across the river at that site.

RANGEWIDE STATUS

The Nature Conservancy has given the channel darter a global status ranking of G4, a national status ranking of N4 and Pennsylvania and Michigan rankings of S1/S2. This means that the species is apparently secure globally and nationally but is critically imperiled/imperiled in the states of Pennsylvania and Michigan (NatureServe 2001). The Pennsylvania Biological Survey Status of the channel darter is categorized as PT=Pennsylvania threatened (Hassinger, et al. 1998). The Pennsylvania Fish and Boat Commission have classified the channel darter as threatened (PA Bulletin, 1999). According to Title 30 of the Commonwealth of Pennsylvania Fish and Boat Code, this classification is for “all species and subspecies declared by (1) the Secretary of the United States Department of Interior to be in such small numbers throughout their range that they become Endangered if their environment worsens, and appear on a Threatened Species list published in the Federal Register; or (2) the Pennsylvania Fish and Boat Commission Executive Director to be in such small numbers throughout their range that they become Endangered if their environment worsens and appear on the Pennsylvania Threatened Species list published in the Pennsylvania Bulletin” (PA Fish and Boat Code, 2000: 2-3). The Michigan Department of Natural Resources has classified the channel darter as endangered. The Eastern Region of the U.S. Forest Service has designated the channel darter as a Regional Forester Sensitive Species on the Allegheny and Huron-Manistee National Forests.

POPULATION BIOLOGY AND VIABILITY

Although the channel darter has historically been considered a rare species in Pennsylvania (Cooper 1983), it is unknown if the species is declining. Trautman (1981) indicated a reduction in population, however some areas in the Ohio River are now supporting a small population of channel darters for the first time in over a decade (Reash 1991). This offers hope that they may be able to repopulate areas when the water quality is improved (Goodchild 1994).

According to Latta (1994), the channel darter should continue to be considered threatened in the State of Michigan because of its low population numbers and patchy distribution. Although new populations have been discovered in Lake St. Clair and the St. Clair River, the apparent decline in populations within the Au Sable and Pine rivers may even warrant a change to State endangered status if it is documented to be real.

POTENTIAL THREATS

Several authors have surmised that a variety of threats exist that could impact channel darter populations. These include siltation and turbidity caused by impoundments, farming, grazing, transportation corridors, dredging, and streamside construction that can destroy spawning habitat necessary for channel darters. Since clear water seems to be a habitat requirement, whether it is necessary for the availability of prey or simply in order to facilitate capturing prey, any activity that increases turbidity could have a detrimental effect. Also, siltation can reduce spawning areas and cause a reduction in larval prey (Trautman 1981).

Impoundments could also limit short migrations to spawning grounds or reduce the flow significantly enough to limit reproduction. The channel darter has not survived in any impoundments created in the Tennessee River drainage (Burkhead and Jenkins 1991). Effluents from sewage treatment plants and factories, as well as incidental pollution (i.e. oil spills) could have adverse effects on channel darters.

In addition, it is not known if the introduction of non-native aquatic species could have a detrimental effect on channel darters (White and Stauffer 1992). Zebra mussels have inhabited two tributaries to the Allegheny River in Pennsylvania, and could potentially infest the river and channel darter habitat. In Michigan, zebra mussels are much more distributed throughout the state than Pennsylvania and thus may affect current channel darter populations.

Parasites may be another potential threat to channel darter populations. Two studies conducted in western Lake Erie found 23% of channel darters with parasites in 1939, and in 1972 a similar study found 72% infested with parasites. The parasites were identified as trematodes, cestodes, and nematodes (Goodchild 1994). Although parasites may not kill darters, they can contribute to poor health and an early death.

Darters are prey for larger fish and some water birds. Since males do not defend their nests against them, *P. caprodes* may eat the eggs of channel darters.

The spawning behavior of channel darters may limit the number of eggs deposited. If it is not possible for the female to mate a sufficient number of times to deposit all her eggs, or if the required water temperature or flow fluctuate, low spawning success and thus a decrease in year class strength would result.

SUMMARY OF LAND OWNERSHIP AND EXISTING HABITAT PROTECTION

Allegheny National Forest

Portions of the Allegheny River within the proclamation boundary of the ANF downstream of the Kinzua Dam are part of a larger section of river that has been designated as a Federal Wild and Scenic River, with a recreational classification. The wild and scenic river is 86.6 miles in length in three segments from Kinzua Dam to Emlenton outside the proclamation boundary. Within the proclamation boundary, the wild and scenic river encompasses about 36.5 miles (out of a length of 45 miles of river within the ANF). Within this corridor, about twenty percent is managed by federal agencies (of which most is part of the ANF). The designation heightens public awareness that proposed activities that could encroach upon the river are under the jurisdiction of the U.S. Army Corps of Engineers and the Pennsylvania Department of Environmental Protection, and are coordinated with the ANF.

Almost the entire shoreline of the Allegheny Reservoir within Pennsylvania is part of the ANF, including the lower portion of the Cornplanter Run watershed. The remainder of the watershed is privately owned. The watershed is 3507 acres in size, 648 (18%) of which are managed by the ANF.

Tionesta Creek winds its way through a mixed ownership pattern of private and public lands, including the ANF. Some of the larger private tracts of land are owned by timber companies. In all, the Tionesta drainage is 306,213 acres, 173,453 acres (57%) of which are managed by the ANF.

Huron-Manistee National Forest

The lower 130 miles of the Au Sable River are within the proclamation boundary of the Huron National Forest (HNF). A majority of the lower 92 miles of the river corridor is National Forest System land and is under the management of the U. S. Forest Service; a 23-mile stretch (between river miles 69 and 92) is designated a Federal Wild and Scenic River. Other land ownership includes Consumers Energy, Michigan Department of Natural Resources (MDNR), and private citizens. The portions not under USFS management are under the jurisdiction of Consumers Energy, MDNR, and the Michigan Department of Environmental Quality (MDEQ). Also, private groups such as the Au Sable River Watershed Restoration Committee and The Headwaters Conservancy are dedicated to maintaining or enhancing aquatic habitat and water quality in the Au Sable River.

Forty percent of the Pine River watershed is within the proclamation boundary of the HNF, but only 20% is actually adjacent to National Forest System lands. The MDNR and private

citizens are the main landowners in that watershed, and the MDNR and MDEQ has jurisdiction over those waters. The Pine River/Van Etten Lake Watershed Coalition has recently formed to improve aquatic habitat conditions in the Pine River system.

According to NatureServe (2001), there are few if any populations of channel darters protected because this would involve whole watershed management and protection. As of May 7, 2001, no heritage programs had reported protected populations.

SUMMARY OF EXISTING MANAGEMENT ACTIVITIES

The Allegheny and Huron-Manistee National Forests are not currently carrying out management activities targeting the channel darter; however, all ground-disturbing activities in or near water trigger an assessment of effects on the darter, and mitigation measures are incorporated into project plans. Also, forest-wide standards and guidelines outlined in the ANF and HMNF Land and Resource Management Plans are designed to minimize effects of management activities on water quality and fish habitat.

The minerals under the ANF are about 95% privately owned. As a result, the thousands of wells on the ANF are regulated by the state of Pennsylvania. The ANF works with mineral owners as well as with the state agency to insure that resources on the ANF are protected or impacts minimized.

PAST AND CURRENT CONSERVATION ACTIVITIES

As stated previously, private groups such as the Au Sable River Watershed Restoration Committee, the Headwaters Conservancy, and the Pine River/Van Etten Lake Watershed Coalition are formulating plans and projects to improve habitat and water quality conditions on these rivers on the HMNF. Although one of their main issues is the conservation of desired non-native species (trout), native species such as the channel darter would also benefit from the habitat restoration.

Similarly on the Allegheny National Forest, several watershed councils have been established along the Wild and Scenic River sections of the Allegheny River to address river management issues, and a recent watershed group on a tributary to the Allegheny River has recently formed and is addressing water quality issues that could benefit channel darter habitat downstream. These efforts aren't directly addressing channel darter habitat, but could have potential benefits.

RESEARCH AND MONITORING

Currently there is no specific research or monitoring being conducted on the Allegheny National Forest for channel darters. However, over the past decade fish surveys have been conducted by various federal and state agencies on a somewhat routine basis, and are supplemented by surveys completed by universities and other private entities. These surveys generally only document the presence of non-game species, and not population estimates.

Similarly, on the Huron-Manistee National Forests, no research or monitoring of channel darters are occurring, other than as a part of general fish surveys. However, as previously mentioned, a crew from Michigan State University is conducting a study on the Pine River assessing the status of trout populations and potential steelhead habitat, and at this time, they have verified the presence of channel darters in this system.

Traditional methods of fish sampling may not give an accurate picture of darter populations because most darters inhabit larger waters that are difficult to sample efficiently by electrofishing techniques. Surveys targeting darters in their preferred habitat using large seines seem to be yielding good results in the headwaters of the Allegheny River and may lead to more accurate population evaluations (Paul McKewon, New York State Department of Environment and Conservation, pers. comm. 2001).

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